Obesity Promotes Tumor Growth Regardless of Diet

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- Presence of fat tissue-derived cells in tumors is related to increased tumor growth.
- The cells incorporate into the blood vessel network that supports tumor growth.
- Blocking recruitment of the cells could provide a new therapeutic approach.

PHILADELPHIA — Researchers may have discovered a new explanation as to why obese patients with cancer often have a poorer prognosis compared with those who are lean. The potential explanation is based on data reported in *Cancer Research*, a journal of the American Association for Cancer Research.

“Studies of the population have clearly established that there is a link between obesity and cancer incidence,” said Mikhail Kolonin, Ph.D., associate professor at the Institute of Molecular Medicine at The University of Texas Health Science Center at Houston. “Moreover, for several cancers, obesity is associated with a poorer prognosis.”

Kolonin and his colleagues evaluated how obesity promotes cancer progression. “Our earlier studies led us to hypothesize that fat tissue called white adipose tissue, which is the fat tissue that expands in individuals who are obese, is itself directly involved and that it is not just diet and lifestyle that are important,” he said.

Their initial results confirmed this hypothesis: In obese and lean mice that ate the same diet, tumors grew much faster in obese mice than they did in lean mice. The researchers also observed that there were far more white adipose tissue cells (called adipose stromal cells) in obese mice than in lean mice and thus turned their focus on the role of these cells.

Detailed analyses indicated cancer induced mobilization of adipose stromal cells into the circulation. Once in the tumors, some of these cells developed into fat cells, while others were incorporated into tumor-associated blood vessels.

Tumor-associated blood vessels support tumor growth by bringing in oxygen and nutrients vital for cancer cell survival and proliferation. Kolonin noted that the ability of adipose stromal cells to contribute to the formation of tumor-associated blood vessels is likely one of the main reasons that the excess of these cells in tumors was associated with increased malignant cell proliferation and tumor growth.

“Our data provide the first in vivo evidence of recruitment of cells from endogenous fat tissue to tumors,” said Kolonin. “The fact that these cells are present in tumors is still an emerging concept. We have shown that not only are they present, but they are also functional and affect tumor growth. Identifying the signals that cause these cells to be recruited to tumors and finding ways to block them might provide a new avenue of cancer treatment.”

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